

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant : Gary D. Spinks  
U.S. Serial No. : 10/527,650  
U.S. Filing Date : September 23, 2005  
Title of the Invention: RAINBOW FIBRES  
Confirmation No. : 7112  
Examiner : Altrev C. Sykes  
Art Unit : 1786

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**DECLARATION UNDER 37 C.F.R. §1.132**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

I, Richard Bryan Jotcham, hereby declare that:

1. I have read and I am familiar with U.S. Patent Application No. 10/527,650 ("the Patent Application").
2. I understand that I am providing this expert witness statement to ease prosecution of the Patent Application.
3. I am qualified to provide my opinion set out in this expert witness statement without bias and with fairness in view of my considerable experience in the area of the technology to which the invention described in the Patent Application relates. The facts set out in this statement are true to the best of my knowledge and belief, and are within my own knowledge unless stated to the contrary. Where I have referred to matters that are not within my own knowledge I have stated the source of my information.
4. I am the Director and Chairman of Axess Technologies Ltd., whose office is at Suite 5, Kestrel House, Mill Street, Trowbridge, Wiltshire BA148BE U.K. I am an experienced Company Director and Development Manager whose career has involved invention, development, implementation and commercialization of novel products and technologies. I am the founder and Chairman of Axess Technologies Ltd, a leading,

independent strategic and technical consultancy in the areas of brand protection, supply chain protection and document security.

5. My professional qualifications are:

- (i) B.Sc.(Hons) Applied Chemistry
- (ii) Chartered Chemist
- (iii) Member of Royal Society of Chemistry
- (iv) Associate of the Institute of Packaging

6. I am an inventor on the following six (6) patent applications:

- (i) UK Pat 9300998.3                      Thermotext Security Thread
- (ii) UK Pat 9601984.9                      Secure Packaging
- (iii) EP 0773 527 B1                      Security Adhesive Label
- (iv) UK Pat 9703407.8                      Magnetic Security Thread
- (v) UK Pat 9828772.5                      Eclipse Security Thread
- (vi) UK Pat 9905787.9                      Holotherm Security Feature

7. Following a career in material science involving mining, ceramics and chemical engineering I joined Portals Bathford in 1988 as Development Chemist with responsibility to create and develop new security features for inclusion into paper. In 1995, I was promoted to Product Development Manager with overall responsibility for all research and development, specifications and trials on the Bathford site. During that period Portals was purchased by De La Rue – the world's largest independent security printer.

8. Whilst at Portals, I developed several security threads including the first windowed security thread in non-banknote paper. I also created a range of security fibres and in particular produced the first invisible fluorescent red viscose security fibre.

9. I founded Axess Technologies Ltd. having identified a need within the market place for independent advice. Since 1999 the company has expanded and operates throughout Europe, North America and Japan. The company focuses on providing strategic advice about innovation and novel products particularly for document security, brand protection, supply chain protection and the launching of new branded products. We advise and assist major multi-national brand owners and document issuers looking to launch new products and protect them against IPR infringement and other criminal activities. We carry out training and lecturing to Associations and Government bodies (e.g. FDA) to improve awareness of the issues associated with secure documents, packaging, fraud and criminal activities.

10. I was awarded First Prize for Industrial Innovation by the Royal Society of Chemistry in Nov. 2000, in recognition of the invention and development of Thermotext®, one of the most successful security features ever introduced into security paper.
11. In view of my education, training and experience, I consider myself qualified to express the statements and opinions herein.
12. I have been asked to comment on the following areas:
  - (i) A brief discussion of developments in security papers prior to 16th September 2002 (the priority date of the Patent Application), including the need for security papers;
  - (ii) The criteria that must be satisfied by a security feature intended for inclusion in a security paper;
  - (iii) The general kind of security features found in security paper prior to 16 September 2002;
  - (iv) What relevant facts were common knowledge of a person skilled in the field of security papers on 15th October 1999;
  - (v) Review of two prior-art documents; and
  - (vi) The non-obviousness of independent claims within the patent application.
13. Regarding developments prior to 16 September 2002, the need for security papers, documents and seals arose in the days when the bartering of goods was supplemented by the use of coinage and promissory notes. It soon became obvious that these notes were valuable and copying them could be lucrative. Since then criminals have expanded their activities to include identity theft, product copying, trademark infringement and fiscal tax evasion.
14. The ready availability of image scanning and digital printing has made it much easier for criminals to produce counterfeits, and as a consequence the producers of banknotes, passports, security paper and security labels have had to become much more inventive in developing features that are either difficult to reproduce or utilise materials that are not readily available.
15. One of the categories of security features for paper products may be classified as 'Inclusions'. Reference here can be made to Axess Technologies 'Security Substrate Technology Report (ISBN 0-9541791-1-0) first published in 2003 and revised in 2009. Typically inclusions are regarded as fibres, threads, planchettes and particles. All of these have been successfully used by security papermakers to stay 'one step

ahead' of the counterfeiters although the most prevalent and widespread have been the fibres and threads.

16. Turning to the criteria that must be satisfied by a security feature intended for inclusion in a security paper, and focusing specifically on inclusions, there are several criteria that affect the suitability and efficacy of their use, namely they ideally should:
  - (i) be difficult to manufacture using commercially available techniques;
  - (ii) utilise materials or components that are not generally available;
  - (iii) have controlled and specified attributes (e.g. colour, size, shape, thickness etc);
  - (iv) be fixed into the paper substrate and be resistant to linting;
  - (v) survive the environmental requirements of the finished document (e.g. light fastness, crease resistance etc);
  - (vi) be verifiable consistently by the target Authenticator (e.g. consumer, investigator, machine reader etc); and
  - (vii) be compatible with subsequent printing and conversion of the document.
17. Turning to the general kind of security features found in security paper prior to 16 September 2002, and focusing specifically on inclusions, the following security features were in commercial and general use prior to 16th September 2002.
18. Fibres: Security fibres were available that were visible or invisible (under ambient light). By far the most common security fibres were 3-5mm viscose fibres that were either single-coloured (red, blue, green, pink, burgundy etc) with no fluorescence and or white fibres with UV fluorescent single colours (most commonly yellow, green or blue). Viscose (also known as rayon) was used because it is made by converting purified cellulose to xanthate, dissolving the xanthate in dilute caustic soda and then regenerating the cellulose from the product as it emerges from a spinneret. As a result the fibres are chemically similar to paper fibre ensuring that the inclusion is locked into the security paper by hydrogen bonding. In the 1990's there was a requirement for invisible fluorescent red fibres predominantly for Eurocheques. This was initially serviced using polyamide (nylon) fibres but considerable problems with fibre linting were experienced by Printers and a major development programme ensued to create invisible fluorescent red viscose fibres. These were first created by Portals Bathford for internal use and then the method was significantly improved by Louisenthal Papierfabrik who made the fibres available to other security papermakers.

19. Strips of paper were not commercially used as security fibres before 2003. Up to that time fibres that were a different single visible colour and single fluorescent colour were commonplace as were fibres with different single colours when illuminated at different wavelengths but striped and/or coded fibres were not commercially utilised.
20. **Planchettes:** Planchettes are tiny discs of paper or polymer that may be coloured, optically variable or fluorescent. Typically they are hexagonal shape although for bespoke applications they can be produced with specific designs. Polymeric planchettes with iridescent properties may be added to one side of the paper substrate during production. They are prone to linting and are quite unpopular with Printers unless coated with an adhesive that sticks them to the surface. Planchettes are very different from fibres. Dimensionally a fibre is typically 3mm long with a predominantly circular thickness of 40µm this would create a visible edge-on area of approx 0.12 mm<sup>2</sup> whereas a typical planchette has a visible area of 6.3 mm<sup>2</sup>. They are manufactured from different materials using different production processes.
21. **Security Threads:** security threads are very dissimilar to fibres or planchettes in terms of their method of manufacture, composition or their method of inclusion into security documents. For a more detailed description of threads that are used in security documents I refer you to Axess Technologies 'Security Paper Threads – Technology Report (ISBN 0-9541791-4-5 First published in 2005 and revised in 2010). Until 2003 security threads were typically strips of polyester between 0.5 to 4mm wide that may be metallised, de-metallised, coated and or printed. These were run continuously into paper during manufacture to create either fully embedded or partially windowed manifestations. The method of producing threads bore no resemblance to the process used to create security fibres.
22. **Security Particles:** by September 2002 there was little widespread use of security particles in security paper. Arjo Wiggins had a product called Hi-Lights that appeared in a few documents (e.g. South African passport) but it was not particularly popular. Appleton licensed the technology from Spectra Systems to create a machine readable version but this was not widely adopted. These particles are spread randomly throughout the paper or in bands and result in specks of visible or fluorescent colour that may be compared with fibres but they are monochromatic and therefore bear no resemblance to multi- coloured fibres.

23. Turning to the question of what relevant facts was common knowledge of a person skilled in the art on 15th October 1999, a description of security fibres at this time is as follows:
24. Security fibres at that time would have been described as extruded or spun, polymeric materials made of polyamide, viscose or polyester coated or dyed with pigments or dyestuffs that imparted a visible or fluorescent colour. Surfaces were smooth or crenulated and fibre lengths typically ranged from 3mm to 10mm with thickness defined in terms of decitex ranging from 5dtex to 28dtex. The standard method of manufacture involved exhaustion dyeing a suspension of the cut fibres in reactors akin to conventional yarn dyeing and, if required, included an additional process such as applying protective coatings or adhesion improvers.
25. U.S. Patent No. 6,054,021 to Kurrle et al. ("Kurrle") relates to authenticatable paper product prepared by adding to a papermaking furnish fibres treated with from about 50-200 lb/ton of a fluorescent whitening agent (FWA). The paper made from the papermaking furnish includes fluorescent cellulosic fibres in an amount ranging from between 0.1-4.0 lb/ton to achieve FWA concentrations within the range of 1-20 ppm.
26. U.S. Patent No. 4,897,300 to Boehm ("Boehm") describes the use of overlapping fluorescent colours that interact in such a way as to create rainbow and colour additive effects on the overlapping portions.
27. Boehm's disclosure bears little relevance to the Patent Application of Mr. Spinks for the following reasons:
- (i) The Boehm thread runs 'from edge to edge' and is therefore typically 70mm long and 1.2mm wide in a fixed position. The fibre of the Patent Application is distributed randomly in the paper matrix.
  - (ii) The Boehm patent refers to security thread. This is typically polyester film and not paper. If the thread was made with paper it would not survive the insertion mechanism on the paper machine.
  - (iii) The Boehm patent relies upon overlapping colours becoming additive whereas the Patent Application specifically refers to printed colours abutting and being in see-through register.
  - (iv) The Boehm patent is restricted to any 'tear - proof synthetic material' it therefore specifically excludes the use of paper.
28. Boehm provides no assistance or insight into the product described in the Patent Application. The materials used are polymeric, not paper. The process is overlapping

colours as opposed to registered print. The format is thread and not discrete fibres.

This patent would be of low regard to someone developing security fibres. The patent does not describe a fibre, does not require front and rear printing and is based on the overlapping of printed regions. Thus there are some similar attributes, in that it does have a plurality of regions that are visible under ultra-violet light, but fundamentally the features are completely different and it is not an obvious step from it to the Patent Application of Mr Spinks.

29. Referring to the objections by the Examiner in Final Office Action dated 24 May 2010, on Page 4 the Examiner states that 'Boehm does not explicitly disclose a fibre, it is well known and understood in the art that threads are made from fibres'. This is an incorrect statement. Security threads are almost exclusively made from continuous polyester film as described above; that explains why Boehm does not refer to fibres. There may be some confusion here with terminology, whereby in the U.S., "thread" has been a term used by persons (such as the media) not skilled in the art to refer to security fibres. Anyone skilled in the art of security threads and inclusions would not confuse these terms. In other words, the threads disclosed in Boehm are not made and cannot be made from the fibres disclosed in Kurrle.
30. The Examiner also states that 'it would have been obvious to one of ordinary skill in the art at the time of the invention to print the paper fibres of Kurrle in the manner taught by Boehm'. This is not correct; the component furnish fibres described by Kurrle have a typical facial area of  $0.018\text{mm}^2$  whereas a typical security fibre has a facial area of almost 10 times this at  $0.12\text{mm}^2$ ; thus, ignoring the fact that printing component furnish fibres of this size with a plurality of colours would be technically impossible, it would not be possible to distinguish between the colours on such a thin fibre.
31. The rejection of claims 2, 4, 7, 8, 9, 12, and 13 all relate to printed security threads and not fibres.
32. The objection made by the Examiner regarding Claim 15, stating that 'Boehm discloses the fibre is cut from a larger fibre (See Col 4, lines 56-60)', also results from a misunderstanding of the terms "fibre" and "thread". Boehm actually states 'The security threads are produced in the known manner, i.e. by printing strip shapes on flat sheets and then cutting them up.' Boehm does not state or imply that fibres bear any resemblance to threads.

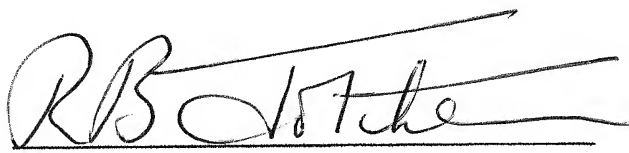
33. Kurrle et al describes the impregnation or saturation of furnish fibres with fluorescent whitening agents. These are then dispersed and added to furnish during papermaking. In Claim 1, Spinks recites 'a security fibre made of paper'. The Oxford Dictionary defines paper as a 'material manufactured in thin sheets from the pulp of wood or other fibrous substances'. Clearly the Kurrle patent involves discrete furnish fibres whereas the Spinks paper involves the use of paper.
34. Claim 1 of the Spinks patent refers to 'a plurality of regions printed on said front and rear of said fibres'. It is technically impossible to print a plurality of regions on individual furnish fibres, which is why Kurrle does not refer to printing but describes a coating or saturation process.
35. Similarly Claim 39 refers to 'a fibre made of paper... wherein a plurality of regions have print ...' Printing more than one colour on a discrete fibre is technically impossible, particularly as the saturation process described by Kurrle involves a mat of component fibres in a random distribution making it impossible to create a plurality of colours on each fibre.
36. Referring to Claim 41, the Oxford Dictionary defines plural as 'more than one in number'. The process of coating or saturation described by Kurrle specifically describes a single application of fluorescent whitening agent. It would not be obvious to anyone reading this patent that more than one colour could be applied that would encompass all of the component fibres or how this could be achieved using Kurrle's technique.
37. Spinks describes the cutting of paper to controlled lengths and widths whereas the Kurrle process relies on the composite individual fibres that will have varying and uncontrolled lengths.
38. Creating a fibre with a plurality of UV fluorescent colours is extremely difficult and was a major step forward in paper security features in 2002. In my opinion the fibres claimed in the Patent Application of Mr. Spinks are novel and inventive over the combination of Kurrle and Boehm. The materials used to manufacture the fibres are not the same as those typically used at that time to make security fibres.
39. I therefore state that, in my expert opinion, neither Kurrle et al. nor Boehm, taken alone or in combination, render the claims of the Patent Application obvious. Specifically, the combination fails to teach or suggest security fibre made of paper, said fibre having a front side, a rear side, a length, and a width, wherein a plurality of regions are printed on said front and rear sides of said fibre, wherein said regions are



coloured and the colours are visible only under ultra-violet light, whereby the fibre is suitable for mixing with slurry paper pulp for paper formation, as recited in instant claim 1, and similar recitations in claims 39 and 41.

40. All statements made herein are of my own knowledge are true and that the statements made on information and belief are believed to be true and further, that the statements were made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001 and that such wilful false statements may jeopardize the validity of the Patent Application or any patent issued thereon.

17/11/10  
Date

  
Richard Bryan JOTCHAM